TOSHIBA

FILE NO. 020-9604

SERVICE MANUAL

COLOR TELEVISION

N5E Chassis

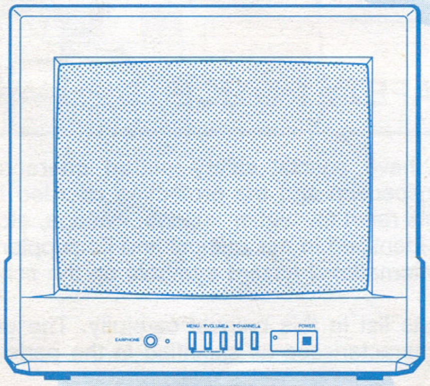
CF13F22, CL14F22

(TAC9611) (TAC9611)

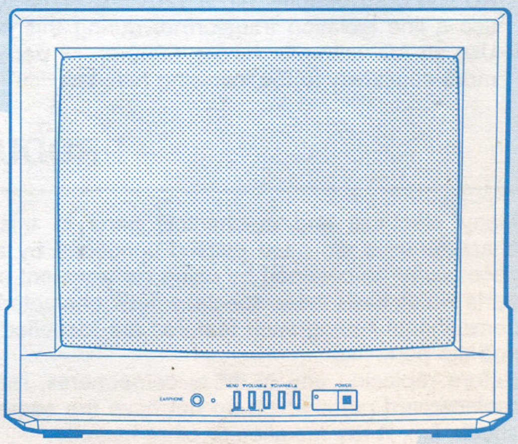
CF19F22, CL20F22

(TAC9610) (TAC9610)

CF13F22/ CL14F22



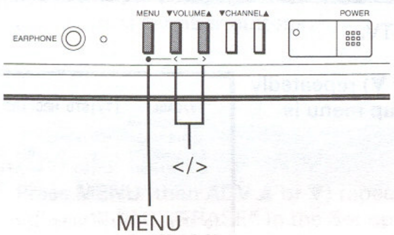
CF19F22/ CL20F22

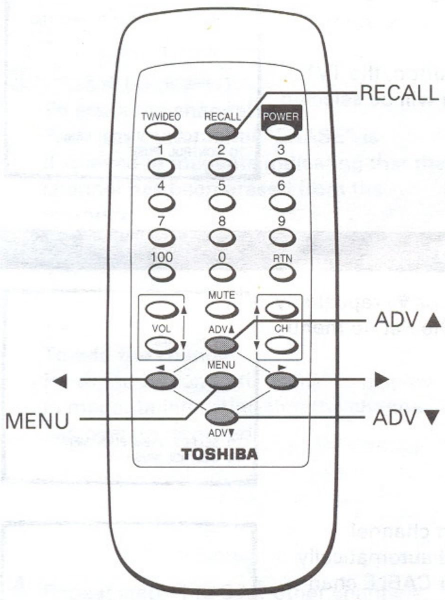


PRINTED IN U.S.A. Apr., 1996 (So)

Menu Function (General Instructions)

We suggest you familiarize yourself with the procedure before using the Menu function.
To adjust any TV feature, the use of the Menu function is required. The adjustments that can be made to the TV appear on the screen.

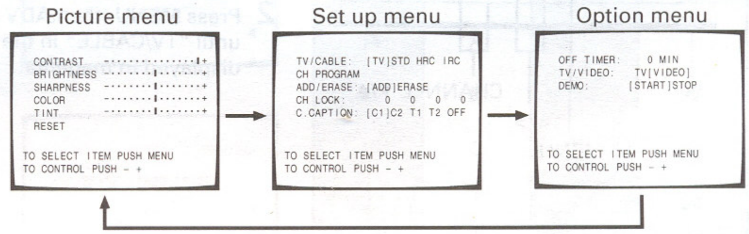




Note: The </> buttons on the TV will function as the VOLUME ▼/▲ buttons when no menu display is on the screen.

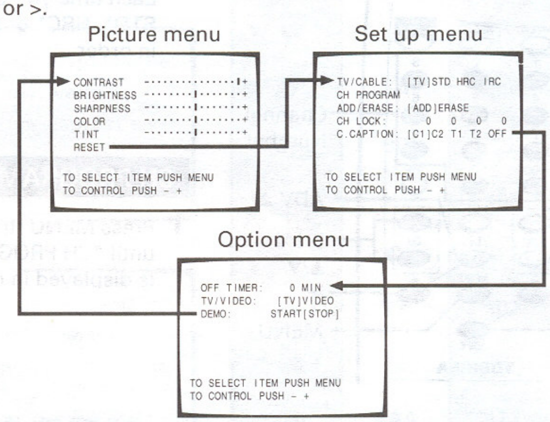
MENU button (on Remote)

Each time you press **MENU**, the Picture, Audio, Setup or Option menu on-screen display is selected in order, then press **ADV**.



MENU button (on TV)

Each time you press **MENU**, each item will be selected in oder, then press < or >.



ADV button (on Remote)

Use **ADV** after you have selected the on-screen menu you want to adjust with the MENU button.
Each time you press **ADV**, the function to be adjusted will be selected in order.

ADV ▲ button .... from bottom to top
ADV ▼ button .... from top to bottom

The selected function will be displayed in magenta.

◄/► (</>) buttons (on TV and on Remote)

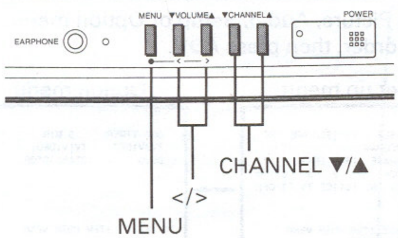
Use ◄ /► (</>) to adjust the function you have selected with the **ADV** button on the Remote Control (or MENU button on the TV).

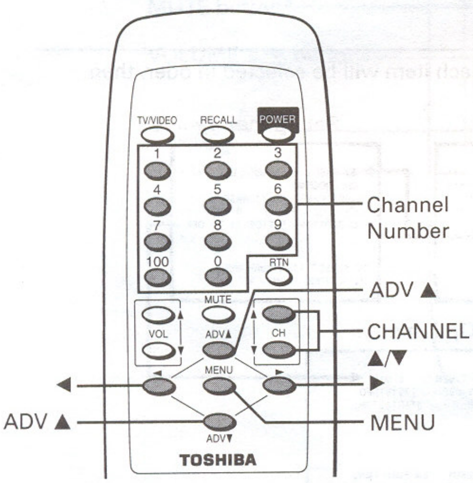
RECALL button (on Remote)

The above four menu displays will automatically disappear from the screen if no control has been operated for about 6 seconds.
If you want to clear the screen of all on-screen displays instantly, press **RECALL**.

Programming Channel Memory

The channel memory is the list of TV channel numbers your TV will stop on when you press the CHANNEL ▲ or ▼ button.
First, use the TV/CABLE and CH PROGRAM functions to preset all active channels in your area.
If necessary, arrange the preset channels with the ADD/ERASE functions so that you can tune into only desired channels.

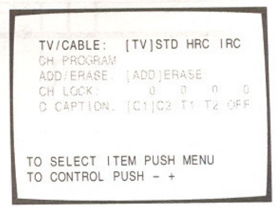




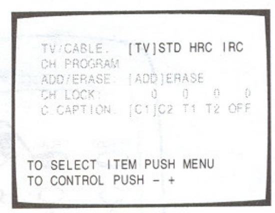
TV/CABLE function

1 Press **POWER** to turn on the TV.

2 Press **MENU** (then **ADV** ▲ or ▼) repeatedly until "TV/CABLE" in the Set up menu is displayed in magenta.

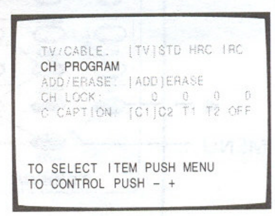


3 Press ◄ (<) or ► (>) until the mode that corresponds to your TV signal system is displayed in magenta.
Each time you press the button, the TV*, STD*, HRC* or IRC* mode will be selected in order.

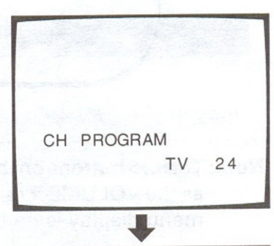


CH PROGRAM function

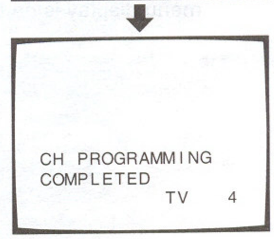
1 Press **MENU** (then **ADV** ▲ or ▼) repeatedly until "CH PROGRAM" in the Set up menu is displayed in magenta.



2 Press ◄ (<) or ► (>) to start channel programming. The TV will automatically cycle through all the TV or CABLE channels depending on the mode selected, and store active channels in the channel memory.



3 When channel programming is complete, you will see the message at the right.



4 Press **CHANNEL** ▲ or ▼ to make sure the channel programming has been done properly.

* This TV receives the following TV signals:

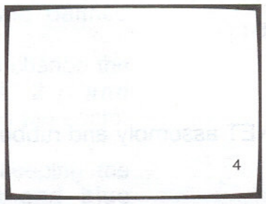
1. **TV**: TV broadcasts signals.
   (VHF channels 2 through 13 and UHF channels 14 through 69)
2. **STD** CABLE: Standard cable TV signals.
3. **HRC** CABLE: Harmonic Related Carrier cable TV signals.
4. **IRC** CABLE: Incremental Related Carrier cable TV signals.

If you are not sure what CABLE system they are using, consult your local CABLE company.

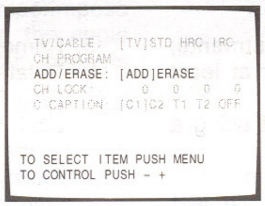
ADD/ERASE function

After performing the CH PROGRAM function, you can add or erase specific channels.

1 Select the channel you want to erase using the **CHANNEL** ▲ or ▼ button, or select the channel you want to add using the **Channel Number** buttons.

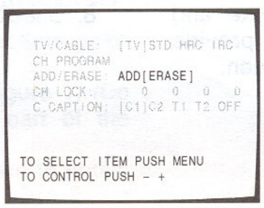


2 Press **MENU** (then **ADV** ▲ or ▼) repeatedly until "ADD/ERASE" in the Set up menu is displayed in magenta.

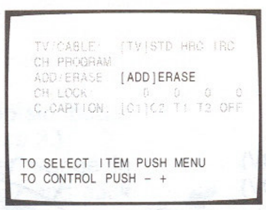


3 Press ◀ (<) or ▶ (>):

To erase the channel
Press the button until "ERASE" is displayed in magenta indicating that the channel has been erased from the memory.



To add the channel
Press the button until "ADD" is displayed in magenta indicating that the channel has been memorized.



4 Repeat steps 1 to 3 for other channels.

You have now completed the channel programming.

CABLE channel reference chart

Number on this TV	Corresponding CABLE channel	Number on this TV	Corresponding CABLE channel
1	A-8	67	67
5	5 (A-7)	68	68
6	6 (A-6)	69	69
14	A	⋮	⋮
15	B	92	92
16	C	93	93
⋮	⋮	94	94
34	U	95	A-5
35	V	96	A-4
36	W	97	A-3
37	AA	98	A-2
38	BB	99	A-1
⋮	⋮	100	100
60	XX	101	101
61	YY	102	102
62	ZZ	⋮	⋮
63	AAA	123	123
64	BBB	124	124
65	65	125	125
66	66		

The above chart is typical of many cable system channel allocations. If in doubt, consult your cable company.

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUSTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

SET-UP ADJUSTMENT

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
  Perform the adjustments in order as follows :
  1. Color Purity
  2. Convergence
  3. White Balance (See page 15.)

  Note: The PURITY/CONVERGENCE MAGNET assembly and rubber wedges need mechanical positioning. Refer to figure 1.

COLOR PURITY ADJUSTMENT

NOTE : Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Set the brightness and contrast to maximum.
3. Use a green raster from among the built-in test signals. See page 13.
4. Loosen the clamp screw holding the yoke and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 2.) around the neck of the picture tube until the green belt is in the center of the screen. At the same time, enter the raster vertically.
7. Slowly move the yoke forward or backward until a uniform green screen is obtained. Tighten the clamp screw of the yoke temporarily.
8. Check the purity of the red and blue raster.

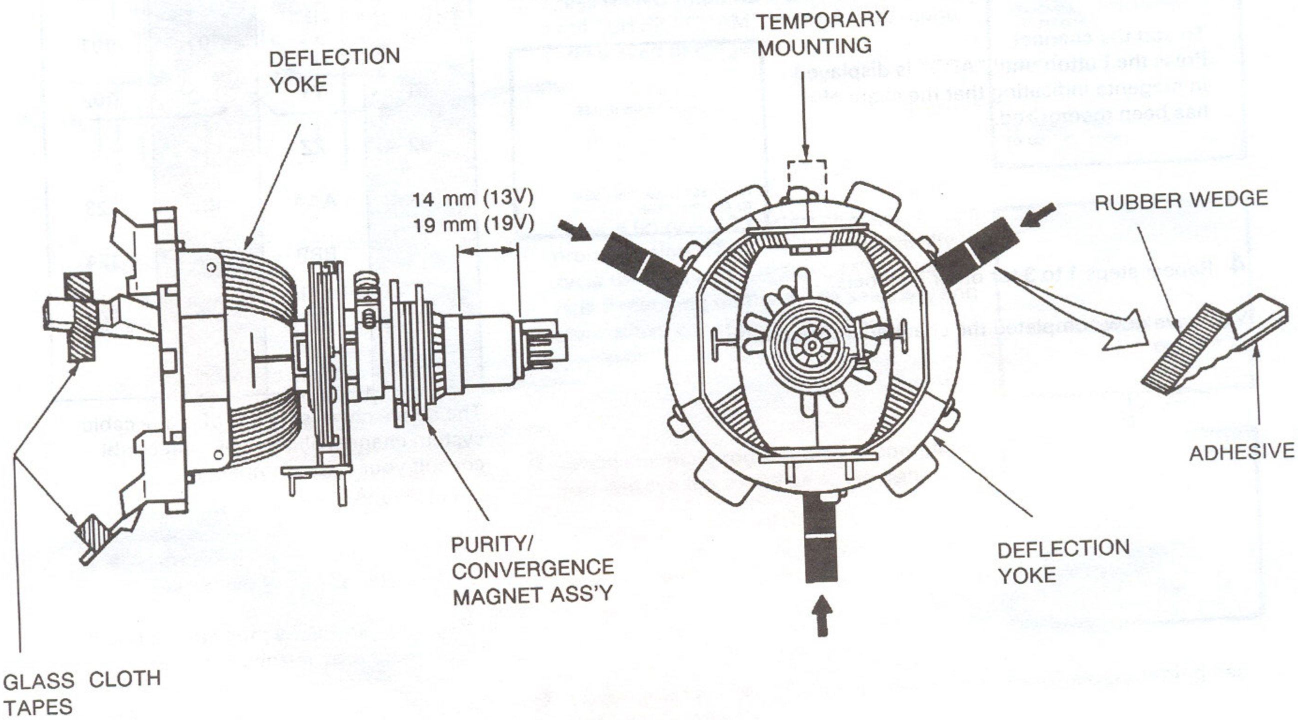


Figure 1.

CONVERGENCE ADJUSTMENTS

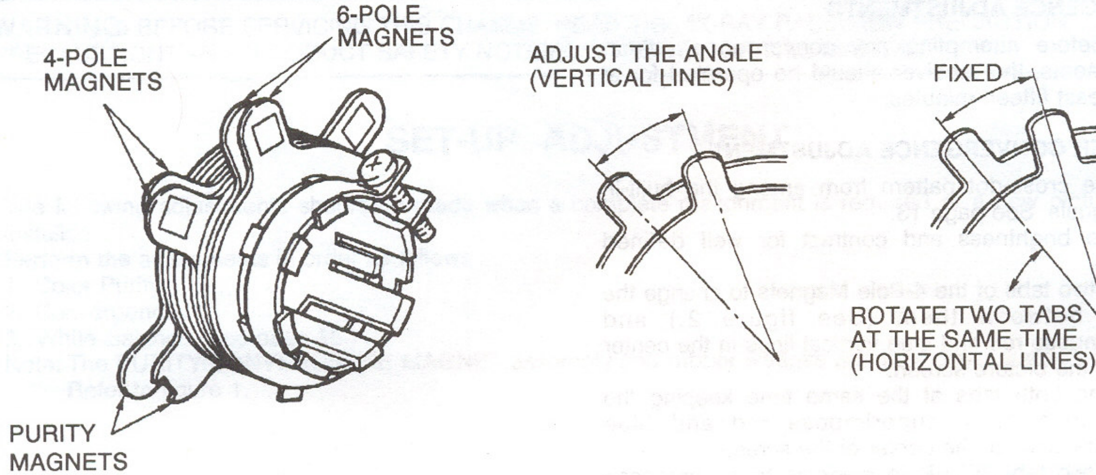
NOTE: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

■ CENTER CONVERGENCE ADJUSTMENT

1. Use the cross-dot pattern from among the built-in test signals. See page 13.
2. Set the brightness and contrast for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 2.) and superimpose red and blue vertical lines in the center area of the picture screen.
4. Turn the both tabs at the same time keeping the angle constant to superimpose red and blue horizontal lines at the center of the screen.
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 keeping in mind red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual interaction and make dot movement complex.

■ CIRCUMFERENCE CONVERGENCE ADJUSTMENT

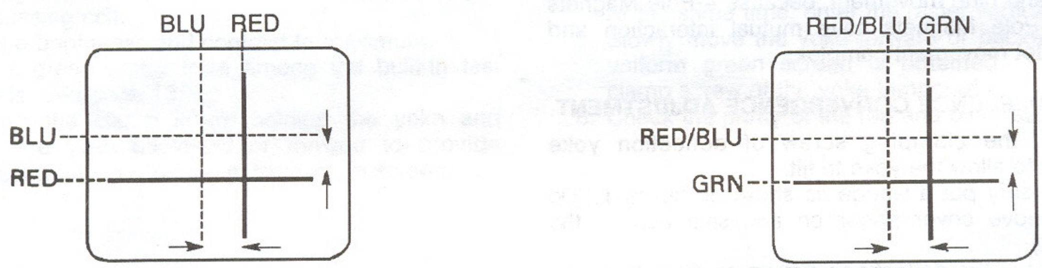
1. Loosen the clamping screw of deflection yoke slightly to allow the yoke to tilt.
2. Temporarily put a wedge as shown in figure 1. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 3.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 3.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence.
   Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick three adhesive tapes on wedges as shown in figure 1.



CONVERGENCE MAGNET ASSEMBLY

ADJUSTMENT OF MAGNETS

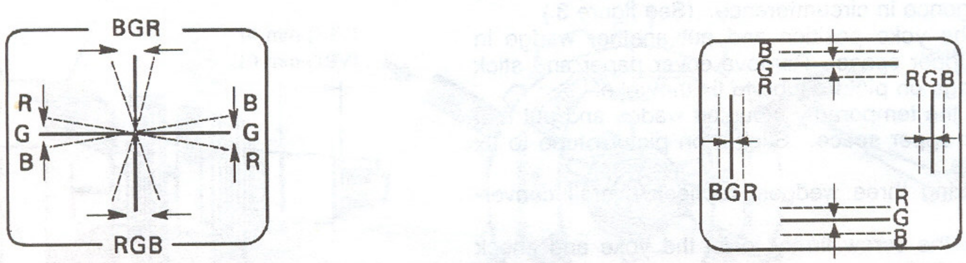
Figure 2.



4-POLE MAGNETS MOVEMENT

6-POLE MAGNETS MOVEMENT

Center Convergence by Convergence Magnets



INCLINE THE YOKE UP (OR DOWN)

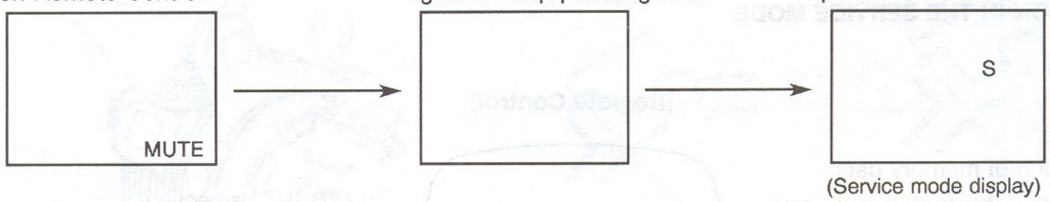
INCLINE THE YOKE RIGHT (OR LEFT)

Circumference Convergence by DEF Yoke

Figure 3. Dot Movement Pattern

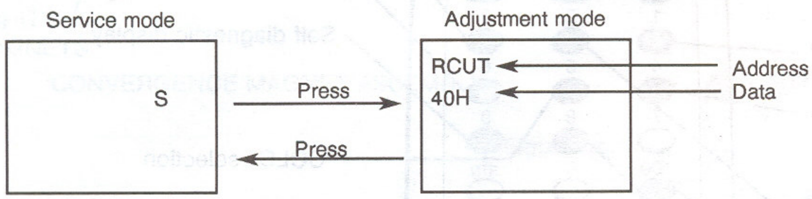
ENTERING TO SERVICE MODE

1) Press MUTE button once on Remote Control.
2) Press MUTE button again to keep pressing.
3) Keep pressing the MUTE button, press MENU button on TV set.



DISPLAYING THE ADJUSTMENT MENU

1) Press MENU button on TV.



SELECTING THE ADJUSTING ITEMS

1) Every pressing of CHANNEL ▲ button changes the adjustment items in the following order. (▼ button for reverse order.)

Address	Function to be adjusted	Reference data	
		CF13F22/CL14F22	CF19F22/CL20F22
☆ RCUT	RED CUT-OFF	40H	←
☆ GCUT	GREEN CUT-OFF	40H	←
☆ BCUT	BLUE CUT-OFF	40H	←
☆ GDRV	GREEN DRIVE	80H	←
☆ BDRV	BLUE DRIVE	80H	←
CNTX	SUB-CONTRAST	50H	←
☆ BRTC	SUB-BRIGHTNESS	38H	←
☆ COLC	SUB-COLOR	2CH	←
☆ TNTC	SUB-TINT	42H	←
☆ HPOS	HORIZONTAL POSITION	1AH	19H
☆ VPOS	VERTICAL POSITION	02H	02H
☆ HIT	HEIGHT	20H	20H

☆ These adjustments may be required when replacing QA02 and Q501.

ADJUSTING THE DATA

1) Pressing of VOLUME ▲ or ▼ button will change the value of data in the range from 00H to FFH. The variable range depends on the adjusting item.

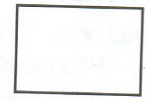
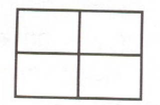
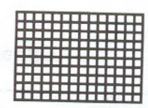
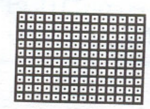
EXIT FROM SERVICE MODE

1) Press POWER button to turn off the TV once.

TEST SIGNAL SELECTION

1) Every pressing of TV/VIDEO button changes the built-in test patterns on screen in the following order.

Normal picture → Red raster → Green raster → Blue raster → All black → All white → White and black → Black cross-bar → White cross-bar → Black cross-hatch → White cross-hatch → White cross-dot → Black cross-dot → Normal picture

Signals	Picture
• Red raster • Green raster • Blue raster • All Black • All White	
	
• Black cross-bar • White cross-bar	
• Black cross-hatch • White cross-hatch	
• Black cross-dot • White cross-dot	

Note: If the video cable is connected to the VIDEO INPUT jack, the built-in pattern signals are not displayed.

INITIALIZATION OF MEMORY DATA OF QA02

After replacing QA02, the following initialization is required.

1. Enter the service mode, then select any register item.
2. Press and hold the RECALL button on the Remote, then press the CHANNEL button on the TV. The initialization of QA02 has been completed.
3. Check the picture carefully. If necessary, adjust any adjustment item above. Perform "Programming Channel Memory" on page 6.

CAUTION: Never attempt to initialize the data unless QA02 has been replaced.

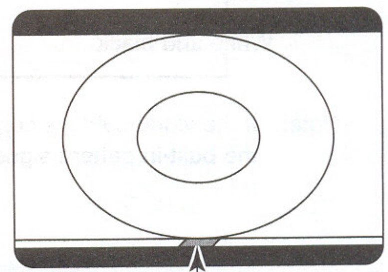
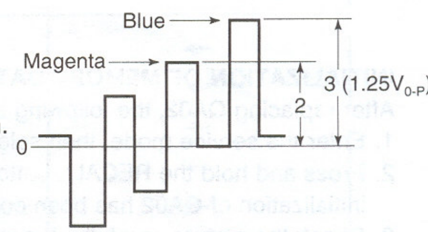
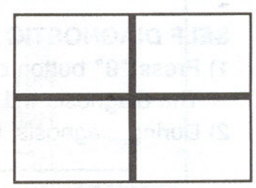
SELF DIAGNOSTIC FUNCTION

1) Press "9" button on Remote Control during display of adjustment menu. The diagnosis will begin to check if interface among IC's are executed properly.

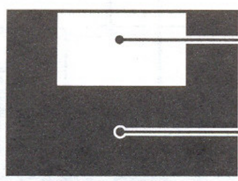
2) During diagnosis, the following displays are shown.

Display	Meaning
NO. 23905436	→ Part number of microprocessor (QA01)
SELF CHECK	
POWER : 000	→ Operation number of protecting circuit ----"000" is normal.
BUS : OK	→ BUS line check ----"OK" is normal.
NO ACK :	→ "[blank]" is normal.

ELECTRICAL ADJUSTMENT

ITEM	ADJUSTMENT PROCEDURE
FOCUS VR ADJ.	1. Enter the service mode, then select any register item. 2. Press the TV/VIDEO button on the Remote until the black cross-bar pattern appears on the screen. 3. Adjust the FOCUS control (on T461) for well defined scanning 24 lines on the picture screen.
SUB-BRIGHTNESS (BRTC)	1. Constrict the picture height until the vertical retrace line appears adjusting the HEIGHT control on the MAIN board. 2. Adjust the CONTRAST to the minimum and BRIGHTNESS to the center. 3. Enter the service mode, then select "**BRTC**" register. 4. Adjust the data value so the belt of vertical retrace line just disappear. 5. Adjust the CONTRAST for the desired contrast. 6. Adjust the HEIGHT control. 
SUB-COLOR (COLC) SUB-TINT (TNTC)	1. Receive color-bar signal from color-bar generator. 2. Adjust the BRIGHTNESS and CONTRAST to the center (RESET status). 3. Connect oscilloscope pin 23 of Q501 on the MAIN board. 4. Enter the service mode, then select "**COLC**". 5. Temporarily adjust the data value to achieve about $1V_{0\text{-}p}$ of blue bar. 6. Select "**TNTC**" register. 7. Adjust the data value to obtain the blue bar to magenta bar ratio of 3:2 as shown. 8. Select "**COLC**" register. 9. Adjust the data value to achieve $1.8V_{0\text{-}p}$ of blue bar on scope. 10. Check the picture with off-air signal. 
HORIZONTAL POSITION (Address : HPOS) VERTICAL POSITION (Address : VPOS)	1. Call up the adjustment mode display, then select the address HPOS or VPOS. 2. Press the TV/VIDEO button until the white cross-bar or black cross-bar pattern appears on the screen. 3. Adjust the HORIZONTAL and VERTICAL position alternately by pressing the VOLUME ▲ or ▼ button for proper picture position. 4. Check the picture with off-air signal. 
HEIGHT (Address : HIT)	1. Call up the adjustment mode display, then select the address **HIT**. 2. Press the VOLUME ▲ or ▼ button to get the picture so the top of raster begins to lack. 3. Press the VOLUME ▲ button to advance the data by 8 steps. Note : Check the vertical picture position is correct.

ITEM	ADJUSTMENT PROCEDURE
WHITE BALANCE Address : RCUT Address : GCUT Address : BCUT Address : GDRV Address : BDRV	1. Adjust the CONTRAST control to the center, and BRIGHTNESS control to the maximum. 2. Call up the adjustment mode display, and press the TV/VIDEO button until the white and black pattern appears on the screen. 3. Adjust the following address with the CHANNEL ▲/▼ and VOLUME ▲/▼ buttons. Address : RCUT ⟶ Data : 40H Address : GDRV ⟶ Data : 80H Address : GCUT ⟶ Data : 40H Address : BDRV ⟶ Data : 80H Address : BCUT ⟶ Data : 40H 4. Press "100" button on the Remote Control to display a single horizontal line on the screen. 5. Turn the SCREEN control (FBT) fully counterclockwise and gradually rotate clockwise until the first horizontal line appears slightly on the screen. 6. Press "100" button to display the normal picture. 7. Adjust the remaining two "?CUT" addresses (CHANNEL ▲/▼ →100 → VOLUME ▲/▼ in order) to obtain the slightly lighted horizontal line in the same levels of three (red, green, blue) colors. The line should be white if the adjustments are proper.



CIRCUIT ADJUSTMENT

HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis. Checking should be done following the steps below.

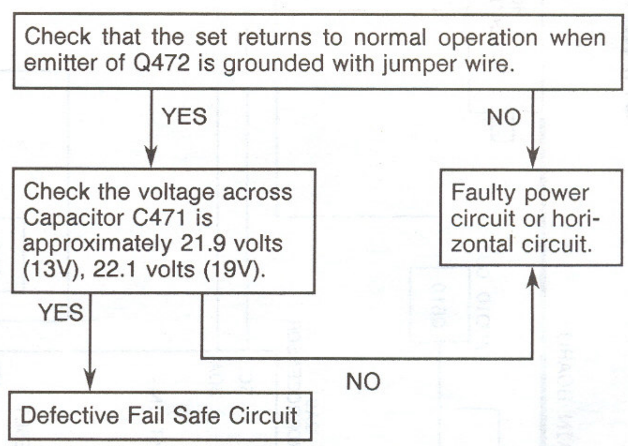
1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST controls to minimum (zero beam current).
3. High voltage must be measured below 24.7 kV (13V) / 28.8 kV (19V).
4. Vary the BRIGHTNESS control to both extremes to be sure the high voltage does not exceed the limit under any conditions.

FS CIRCUIT CHECK

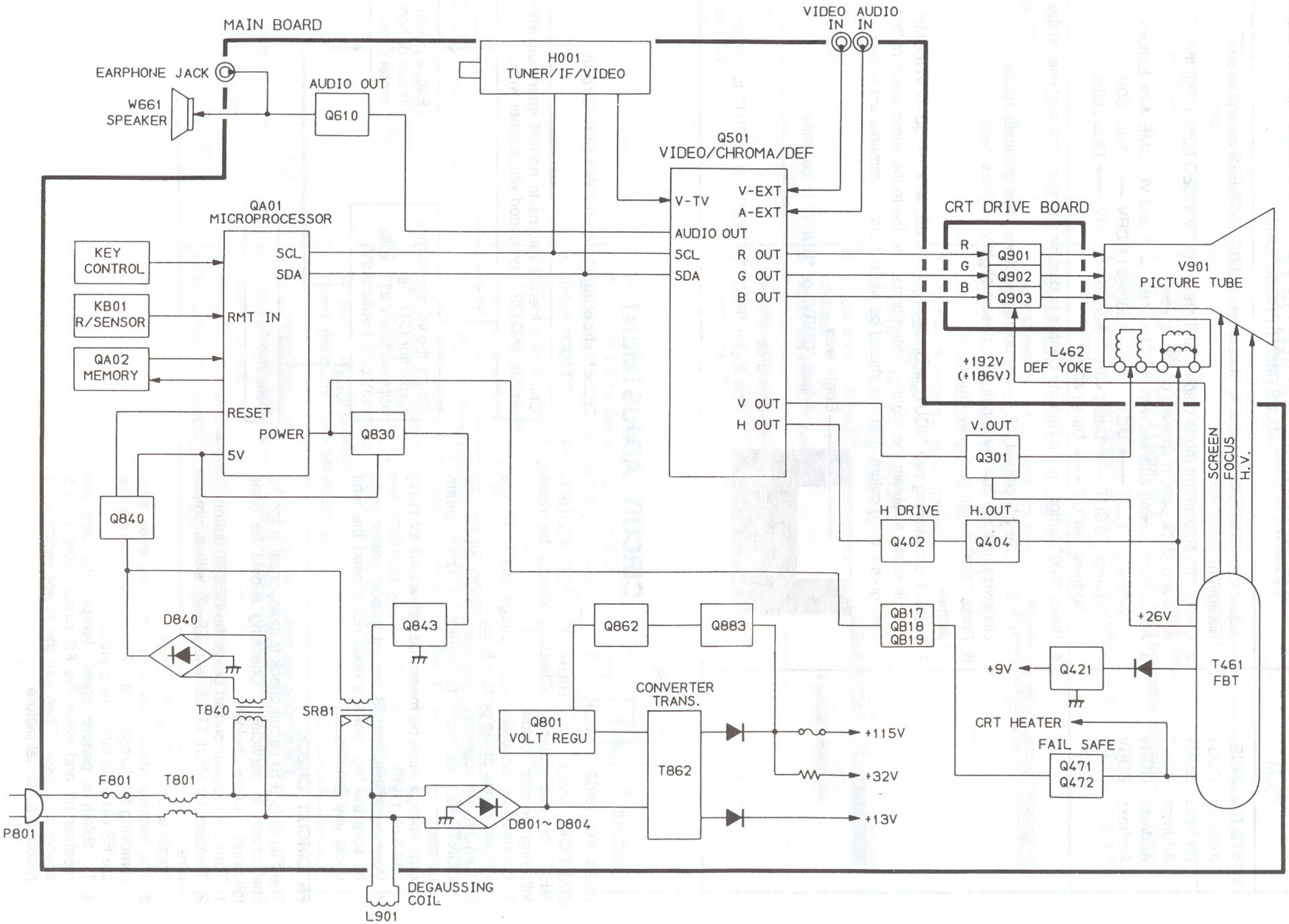
The Fail Safe (FS) circuit check is indispensable for the final check in servicing. Checking should be done following the steps below.

1. Turn the receiver on and press the RESET button.
2. Temporarily short TP- Ⓡ and TP- Ⓧ with a jumper wire.
   Raster and sound will disappear.
3. The receiver must remain in this state even after removing the jumper wire. This is the evidence that the FS circuit is functioning properly.
4. To obtain a picture again, temporarily turn the receiver off and allow the FS circuit more than 5 seconds to reset. Then turn the power switch on to produce a normal picture.

Troubleshooting Guide for Fail Safe Circuit



CHASSIS BLOCK DIAGRAM



CHASSIS REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

CAUTION: The international hazard symbols " ⚠ " in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

NOTICE:
- *The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.*
- *The PC board assembly with * mark is no longer available after the end of the production.*

Models : CF13F22/ CL14F22

ABBREVIATIONS:

Capacitors......... CD : Ceramic Disk PF : Plastic Film EL : Electrolytic
Resistors........... CF : Carbon Film CC : Carbon Composition MF : Metal Film
OMF : Oxide Metal Film VR : Variable Resistor FR : Fusible Resistor

(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C101	24797100	EL, 10μF, ±20%, 50V
C102	24763101	EL, 100μF, ±20%, 16V
C103	24232103	CD, 0.01μF, +80%, −20%
C113	24794470	EL, 47μF, ±20%, 16V
C201	24797478	EL, 0.47μF, ±20%, 50V
C202	24794220	EL, 22μF, ±20%, 16V
C205	24794220	EL, 22μF, ±20%, 16V
C207	24794100	EL, 10μF, ±20%, 16V
C208	24797010	EL, 1μF, ±20%, 50V
C209	24797229	EL, 2.2μF, ±20%, 50V
C210	24794470	EL, 47μF, ±20%, 16V
C230	24794470	EL, 47μF, ±20%, 16V
C232	24092398	CD, 0.1μF, +80%,−20%
C233	24797100	EL, 10μF, ±20%, 50V
C301	24617912	EL, 2.2μF, ±10%, 50V
C302	24212152	CD, 1500pF, ±10%
C305	24617912	EL, 2.2μF, ±10%, 50V
C306	24073044	EL, 3300μF, ±20%, 16V
C307	24082047	PF, 0.033μF, 100V
C308	24668101	EL, 100μF, ±20%, 35V
C309	24591102	PF, 1000pF
C310	24796471	EL, 470μF, ±20%, 35V
C311	24214221	CD, 220pF, ±10%, 500V
C313	24082260	PF, 4700pF, 100V
C314	24590563	PF, 0.056μF
C315	24797229	EL, 2.2μF, ±20%, 50V
C317	24214471	CD, 470pF, ±10%, 500V
C403	24591203	PF, 0.02μF
C404	24797229	EL, 2.2μF, ±20%, 50V
C417	24214391	CD, 390pF, ±10%, 500V
C421	24794470	EL, 47μF, ±20%, 16V
C431	24794101	EL, 100μF, ±20%, 16V
⚠ C440	24082549	PF, 7500pF, ±3%, 1250V
⚠ C442	24082672	PF, 0.43μF, 250V
C445	24828223	PF, 0.022μF, 200V
C446	24700100	EL, 10μF, ±20%, 250V
C448	24640908	EL, 33μF, ±20%, 160V
C449	24794102	EL, 1000μF, ±20%, 16V
C463	24212152	CD, 1500pF, ±10%
C471	24797479	EL, 4.7μF, ±20%, 50V
C474	24794100	EL, 10μF, ±20%, 16V
C504	24353090	CD, 9pF, ±0.25pF
C510	24797229	EL, 2.2μF, ±20%, 50V
C514	24591223	PF, 0.022μF
C515	24538104	PF, 0.1μF
C607	24797100	EL, 10μF, ±20%, 50V
C609	24591103	PF, 0.01μF
C610	24795220	EL, 22μF, ±20%, 25V
C611	24591104	PF, 0.1μF
C613	24794221	EL, 220μF, ±20%, 16V
C614	24797478	EL, 0.47μF, ±20%, 50V
C801	24082001	PF, 0.47μF, ±20%, AC125V
C810	24086052	EL, 220μF, ±20%, 200V
C811	24092270	CD, 4700pF, ±20%, AC400V
C812	24094820	CD, 2200pF, ±20%, AC400V
C815	24094820	CD, 2200pF, ±20%, AC400V
C819	24766478	EL, 0.47μF, ±20%, 50V
C840	24795471	EL, 470μF, ±20%, 25V
C842	24792101	EL, 100μF, ±20%, 6.3V
C843	24539104	PF, 0.1μF
C860	24214103	CD, 0.01μF, ±10%, 500V
C862	24591821	PF, 820pF
C863	24539104	PF, 0.1μF
C865	24092345	CD, 1000pF, ±10%, 2kV
C866	24669478	EL, 0.47μF, ±20%, 50V
C867	24212682	CD, 6800pF, ±10%
C868	24667101	EL, 100μF, ±20%, 25V
C869	24678229	EL, 2.2μF, ±20%, 200V
C870	24095802	PF, 0.068μF, 400V
C871	24092345	CD, 1000pF, ±10%, 2kV
C873	24539224	PF, 0.22μF
C874	24435221	CD, 220pF, 500V
C876	24539104	PF, 0.1μF
C884	24640018	EL, 220μF, ±20%, 160V
C885	24214471	CD, 470pF, ±10%, 500V
C889	24795471	EL, 470μF, ±20%, 25V
C891	24082229	PF, 0.1μF, ±10%, 250V
C893	24092338	CD, 270pF, ±10%, 2kV
C894	24092338	CD, 270pF, ±10%, 2kV
C898	24212101	CD, 100pF, ±10%
C902	24211102	CD, 1000pF, ±10%, 2kV

Location No.	Part No.	Description
C921	24212561	CD, 560pF, ±10%
C922	24212681	CD, 680pF, ±10%
C923	24212561	CD, 560pF, ±10%
C972	24232103	CD, 0.01μF, +80%, −20%
CA28	24472100	CD, 10pF
CA29	24472100	CD, 10pF
CA33	24232103	CD, 0.01μF, +80%, −20%
CA36	24474101	CD, 100pF, ±10%
CA37	24474101	CD, 100pF, ±10%
CA38	24474101	CD, 100pF, ±10%
CA42	24794100	EL, 10μF, ±20%, 16V
CA43	24232103	CD, 0.01μF, +80%, −20%
CA68	24794100	EL, 10μF, ±20%, 16V
CA69	24232103	CD, 0.01μF, +80%, −20%
CB01	24794470	EL, 47μF, ±20%, 16V
CB20	24474101	CD, 100pF, ±10%
CR01	24797478	EL, 0.47μF, ±20%, 50V
CR02	24797478	EL, 0.47μF, ±20%, 50V
CR03	24797478	EL, 0.47μF, ±20%, 50V
CS02	24797229	EL, 2.2μF, ±20%, 50V
CS03	24797478	EL, 0.47μF, ±20%, 50V
CS10	24797479	EL, 4.7μF, ±20%, 50V
CS11	24797478	EL, 0.47μF, ±20%, 50V
CT63	24591223	PF, 0.022μF
CV06	24797478	EL, 0.47μF, ±20%, 50V

RESISTORS

Location No.	Part No.	Description
R101	24382153	OMF, 15k ohm, 1W
R102	24381560	OMF, 56 ohm, 1/2W
R103	24366681	CF, 680 ohm
R201	24552391	OMF, 390 ohm, 1/2W
R208	24366683	CF, 68k ohm
R227	24366363	CF, 36k ohm
R230	24366223	CF, 22k ohm
R233	24366152	CF, 1500 ohm
R235	24366184	CF, 180k ohm
R236	24366101	CF, 100 ohm
R237	24366101	CF, 100 ohm
R238	24366472	CF, 4700 ohm
R239	24366152	CF, 1500 ohm
R241	24366433	CF, 43k ohm
R242	24366473	CF, 47k ohm
R244	24366393	CF, 39k ohm
R245	24366274	CF, 270k ohm
R246	24366225	CF, 2.2M ohm
R301	24366102	CF, 1k ohm
R303	24366102	CF, 1k ohm
R304	24366363	CF, 36k ohm
R305	24322159	OMF, 1.5 ohm, 1W
R306	24366273	CF, 27k ohm
R307	24366334	CF, 330k ohm
R313	24366393	CF, 39k ohm
R317	24366243	CF, 24k ohm
R327	24338689	MF, 6.8 ohm, 1W
R336	24383271	OMF, 270 ohm, 2W
R337	24366223	CF, 22k ohm
R338	24366223	CF, 22k ohm
R401	24366391	CF, 390 ohm
R402	24366103	CF, 10k ohm
R403	24366332	CF, 3300 ohm
R404	24553121	OMF, 120 ohm, 1W
R405	24553392	OMF, 3900 ohm, 1W
R406	24366333	CF, 33k ohm
R407	24366223	CF, 22k ohm
R410	24366391	CF, 390 ohm
R411	24366561	CF, 560 ohm
R416	24019325	OMF, 2200 ohm, 5W
R421	24321339	OMF, 3.3 ohm, 1/2W
R422	24366471	CF, 470 ohm
R430	24366102	CF, 1k ohm
R431	24366103	CF, 10k ohm
R432	24366222	CF, 2200 ohm
R448	24338828	MF, 0.82 ohm, 1W
R472	24376270	CF, 27 ohm, 1/2W
⚠R475	24367431	CF, 430 ohm, ±2%
R476	24366823	CF, 82k ohm
R477	24366223	CF, 22k ohm
⚠R478	24327133	MF, 13k ohm, ±1%, 1/4W
R481	24366333	CF, 33k ohm
⚠R482	24327512	MF, 5100 ohm, ±1%, 1/4W
R503	24366334	CF, 330k ohm
R504	24366332	CF, 3300 ohm
R506	24366101	CF, 100 ohm
R507	24366101	CF, 100 ohm
R508	24366101	CF, 100 ohm
R513	24366332	CF, 3300 ohm
R514	24366332	CF, 3300 ohm
R603	24366391	CF, 390 ohm
R604	24366102	CF, 1k ohm
R605	24366339	CF, 3.3 ohm
R663	24366221	CF, 220 ohm
R808	24000209	PTC Thermistor, RZ45P2C120M1
R810	24510129	Cement, 1.2 ohm, 5W
R816	24366471	CF, 470 ohm
R818	24366561	CF, 560 ohm
R819	24366102	CF, 1k ohm
R861	24382103	OMF, 10k ohm, 1W
R862	24381220	OMF, 22 ohm, 1/2W
R864	24552102	OMF, 1k ohm, 1/2W
R866	24552470	OMF, 47 ohm, 1/2W
R870	24381271	OMF, 270 ohm, 1/2W
R871	24381820	OMF, 82 ohm, 1/2W
R872	24382104	OMF, 100k ohm, 1W
R883	24381153	OMF, 15k ohm, 1/2W
R884	24366102	CF, 1k ohm
R889	24546109	FR, 1 ohm, 1/2W
R891	24366102	CF, 1k ohm
R898	24946395	CC, 3.9M ohm, ±10%, 1/2W
R899	24946395	CC, 3.9M ohm, ±10%, 1/2W
R901	24376472	CF, 4700 ohm, 1/2W
R902	24376472	CF, 4700 ohm, 1/2W
R903	24376472	CF, 4700 ohm, 1/2W
R911	24366101	CF, 100 ohm
R912	24366101	CF, 100 ohm
R913	24366101	CF, 100 ohm
R920	24000568	FR, 4.7 ohm, 1W
R921	24366471	CF, 470 ohm
R922	24366471	CF, 470 ohm
R923	24366471	CF, 470 ohm
R931	24366122	CF, 1200 ohm
R932	24366122	CF, 1200 ohm
R933	24366122	CF, 1200 ohm
R941	24366680	CF, 68 ohm
R942	24366680	CF, 68 ohm
R943	24366680	CF, 68 ohm
R961	24554183	OMF, 18k ohm, 2W
R962	24554183	OMF, 18k ohm, 2W

Location No.	Part No.	Description
R963	24554183	OMF, 18k ohm, 2W
R971	24366821	CF, 820 ohm
R972	24366102	CF, 1k ohm
R973	24366391	CF, 390 ohm
R974	24366331	CF, 330 ohm
RA03	24366102	CF, 1k ohm
RA07	24366102	CF, 1k ohm
RA08	24366102	CF, 1k ohm
RA13	24366102	CF, 1k ohm
RA16	24366102	CF, 1k ohm
RA17	24366102	CF, 1k ohm
RA18	24366102	CF, 1k ohm
RA22	24366472	CF, 4700 ohm
RA23	24366472	CF, 4700 ohm
RA24	24366472	CF, 4700 ohm
RA25	24366822	CF, 8200 ohm
RA26	24366102	CF, 1k ohm
RA27	24366102	CF, 1k ohm
RA33	24366103	CF, 10k ohm
RA34	24366102	CF, 1k ohm
RA35	24366102	CF, 1k ohm
RA36	24366103	CF, 10k ohm
RA37	24366331	CF, 330 ohm
RA38	24366331	CF, 330 ohm
RA61	24366103	CF, 10k ohm
RA62	24366103	CF, 10k ohm
RA67	24366103	CF, 10k ohm
RA68	24366103	CF, 10k ohm
RA70	24366333	CF, 33k ohm
RA71	24366683	CF, 68k ohm
RA72	24366223	CF, 22k ohm
RA73	24366103	CF, 10k ohm
RB01	24366271	CF, 270 ohm
RB03	24366101	CF, 100 ohm
RB09	24366470	CF, 47 ohm
RB11	24366103	CF, 10k ohm
RB26	24366103	CF, 10k ohm
RB27	24366103	CF, 10k ohm
RB28	24366104	CF, 100k ohm
RB30	24366103	CF, 10k ohm
RB40	24366103	CF, 10k ohm
RB41	24366182	CF, 1800 ohm
RB42	24366102	CF, 1k ohm
RB43	24366103	CF, 10k ohm
RB44	24366682	CF, 6800 ohm
RB45	24366221	CF, 220 ohm
RR90	24366122	CF, 1200 ohm
RR91	24366122	CF, 1200 ohm
RR92	24366122	CF, 1200 ohm
RR93	24366472	CF, 4700 ohm
RS01	24366102	CF, 1k ohm
RT61	24366332	CF, 3300 ohm
RT63	24366102	CF, 1k ohm
RV01	24366750	CF, 75 ohm
RV03	24366390	CF, 39 ohm

COILS & TRANSFORMERS

Location No.	Part No.	Description
L301	23103859	Coil (Ferrite Bead), TEM2011
L410	23103859	Coil (Ferrite Bead), TEM2011
⚠L462	23231066	Deflection Yoke, TDY-314LS
L805	23248150	Coil, Choke, TLN3427
L806	23221747	Coil, Choke, TRF9253D
L862	23103859	Coil (Ferrite Bead), TEM2011
L883	23103859	Coil (Ferrite Bead), TEM2011
L884	23103859	Coil (Ferrite Bead), TEM2011
L885	23221722	Coil, Choke, TLN3142D
L886	23103859	Coil (Ferrite Bead), TEM2011
⚠L901	23200283	Coil, Degaussing, TSB-2219AG
LA01	23289100	Coil, Peaking, TRF4100AF
LB01	23289560	Coil, Peaking, TRF4560
T401	23224983	Transformer, Horiz. Drive, TLN1039
⚠T461	23236507	Transformer, Flyback, TFB4122CS
⚠T801	23211663	Line Filter, TRF3194
⚠T840	23213513	Transformer, Power, TPW1459AZ
⚠T862	23217309	Transformer, Converter, TPW3318BG

SEMICONDUCTORS

Location No.	Part No.	Description
Q101	23114528	Transistor, 2SC1740S-Q
Q301	B0377890	IC, TA8403K
Q402	A6330069	Transistor, 2SC2482 FA-1
⚠Q404	A6871242	Transistor, 2SD1554
Q421	23314141	Transistor, 2SC3852
Q471	23114530	Transistor, 2SA933S-Q
Q472	23114528	Transistor, 2SC1740S-Q
Q501	B0385424	IC, TA1223AN
Q610	23119668	IC, TDA2611A
Q801	23905433	IC, STR-Z2753
Q817	23114528	Transistor, 2SC1740S-Q
Q818	A6012010	Transistor, RN2201
Q819	23114528	Transistor, 2SC1740S-Q
Q840	23318299	IC, L78MR05
Q843	A6002050	Transistor, RN1205
⚠Q862	A8643135	Photo Coupler, TLP621(GRL)
Q883	A6907777	IC, S1854 FA-4
Q901	A6330059	Transistor, 2SC2482(C)
Q902	A6330059	Transistor, 2SC2482(C)
Q903	A6330059	Transistor, 2SC2482(C)
Q971	A6534053	Transistor, 2SA1015-Y(TE
QA01	23905436	IC, TMP87CH34BN
QA02	23904938	IC, 24LC01BI/P
QB01	23114528	Transistor, 2SC1740S-Q
QB03	A6002050	Transistor, RN1205
QB21	23114528	Transistor, 2SC1740S-Q
QB30	23114528	Transistor, 2SC1740S-Q
QB40	23114528	Transistor, 2SC1740S-Q
D102	23316673	Diode, Zener, MTZJ5,6C
D201	23316292	Diode, Zener, UZ3.3BSA
D204	23115537	Diode, 1SS131
D205	23115537	Diode, 1SS131
D210	23115537	Diode, 1SS131
D301	A7568460	Diode, TVR-1B
D302	23118094	Diode, EU2A
D406	23118094	Diode, EU2A
D408	23118479	Diode, BYD33J
D410	23316325	Diode, Zener, UZ9.1BSC
D421	23316690	Diode, Zener, MTZJ10B
D441	23316324	Diode, Zener, UZ9.1BSB
D445	23118479	Diode, BYD33J
D471	A7568460	Diode, TVR-1B
⚠D472	23115774	Diode, Zener, RD6.2E(4)
D501	23316323	Diode, Zener, UZ9.1BSA
D502	23316323	Diode, Zener, UZ9.1BSA
D503	23316323	Diode, Zener, UZ9.1BSA
D801	A7568754	Diode, 1S1887AFA-1

Location No.	Part No.	Description
D802	A7568754	Diode, 1S1887AFA-1
D803	A7568754	Diode, 1S1887AFA-1
D804	A7568754	Diode, 1S1887AFA-1
D840	23316962	Diode, S1WBA20 4101
D845	23115537	Diode, 1SS131
D862	23118094	Diode, EU2A
D864	23118094	Diode, EU2A
D866	23316360	Diode, Zener, UZ27BSC
D875	23316333	Diode, Zener, UZ12BSB
D876	23316360	Diode, Zener, UZ27BSC
D881	23115537	Diode, 1SS131
D883	23316813	Diode, EG1
D884	23316813	Diode, EG1
D885	23118094	Diode, EU2A
⚠D899	24000268	Varistor, ENC271D-14A
D902	23115537	Diode, 1SS131
D903	23115537	Diode, 1SS131
DB01	23358501	Diode (LED), SCL003URC5F
DB03	23358522	LED, SIR-56SB3F
DB30	23115537	Diode, 1SS131
MISCELLANEOUS		
E502	23848729	Rubber Wedge
⚠F301	23144727	Fuse, 0.4A
F301A	23165433	Holder, Fuse
⚠F470	23144495	Fuse, 0.8A
F470A	23165433	Holder, Fuse
⚠F801	23144735	Fuse, 5.0A
F801A	23165433	Holder, Fuse
⚠F860	23144509	Fuse, 2.5A
G060	24366101	CF, 100 ohm
G101	23316694	Diode, Zener, UZT33
G204	23238714	Coil, Peaking, TRF4100AJ
G411	23103880	Coil (Ferrite Bead), TEM2011Y
G813	24092270	CD, 4700pF, ±20%, AC125V
G814	24094820	CD, 2200pF, ±20%, AC250V
G816	24094820	CD, 2200pF, ±20%, AC250V
G861	23103880	Coil (Ferrite Bead), TEM2011Y
⚠G882	23316653	Diode, Zener, MTZJ2.7B
KB01	23905177	Remote Sensor, PIC-TB16
P661	23365728	Jack, Eerphone
⚠P801	23176005	Power Cord
SA01	23145227	Switch, Push, 1C1P
SA02	23145227	Switch, Push, 1C1P
SA03	23145227	Switch, Push, 1C1P
SA04	23145227	Switch, Push, 1C1P
SA05	23145227	Switch, Push, 1C1P
SA07	23145227	Switch, Push, 1C1P
⚠SR81	23146916	Power Relay, DG1U-12
⚠V901A	23902970	Socket, CRT, 8P
V901M	23102909	Magnet, Purity-Convergence, MAG-1052
W661	23351111	Speaker, SPK-1378, 77x77mm, 16 ohm
X401	23153721	Ceramic Resonator, 503kHz, TCR1023
X501	23153961	Crystal, 3.58MHz
XA01	23153325	Ceramic Resonator, 8.00M, TCR1056
PC BOARD ASSEMBLIES		
＊M051Z		Main Board, PB6283-1
＊M052Z		CRT Drive Board, PB6283-2

Location No.	Part No.	Description
PICTURE TUBE		
⚠V901	23312417	Picture Tube, A34KQV42X
TUNER		
⚠H001	23321188	Tuner, EL921L1
ACCESSORIES		
K912	23306161	Remote Hand Unit, CT-9852
AT03	23305976	Battery Cover
Y101	23562730	Owner's Manual, English/French, CF13F22
Y101	23562791	Owner's Manual, English/Spanish, CL14F22
Y107	23142003	Adapter, Antenna, AD-503J
Y126	23323051	Antenna, VHF Telescopic

CHASSIS REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

CAUTION: The international hazard symbols " ⚠ " in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

NOTICE:
- *The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.*
- *The PC board assembly with * mark is no longer available after the end of the production.*

Models : CF19F22/ CL20F22

ABBREVIATIONS:

Capacitors.........	CD : Ceramic Disk	PF : Plastic Film	EL : Electrolytic
Resistors...........	CF : Carbon Film	CC : Carbon Composition	MF : Metal Film
	OMF : Oxide Metal Film	VR : Variable Resistor	FR : Fusible Resistor

(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C101	24797100	EL, 10μF, ±20%, 50V
C102	24763101	EL, 100μF, ±20%, 16V
C103	24232103	CD, 0.01μF, +80%, −20%
C113	24794470	EL, 47μF, ±20%, 16V
C201	24797478	EL, 0.47μF, ±20%, 50V
C202	24794220	EL, 22μF, ±20%, 16V
C205	24794220	EL, 22μF, ±20%, 16V
C207	24794100	EL, 10μF, ±20%, 16V
C208	24797010	EL, 1μF, ±20%, 50V
C209	24797229	EL, 2.2μF, ±20%, 50V
C210	24794470	EL, 47μF, ±20%, 16V
C211	24232103	CD, 0.01μF, +80%, −20%
C230	24794331	EL, 330μF, ±20%, 16V
C231	24232103	CD, 0.01μF, +80%, −20%
C232	24092398	CD, 0.1μF, +80%, −20%
C233	24797100	EL, 10μF, ±20%, 50V
C235	24353080	CD, 8pF, ±0.25pF
C301	24617912	EL, 2.2μF, ±10%, 50V
C302	24212152	CD, 1500pF, ±10%
C305	24617912	EL, 2.2μF, ±10%, 50V
C306	24073043	EL, 2200μF, ±20%, 16V
C307	24082047	PF, 0.033μF, 100V
C308	24668101	EL, 100μF, ±20%, 35V
C309	24591102	PF, 1000pF
C310	24796102	EL, 1000μF, ±20%, 35V
C311	24214221	CD, 220pF, ±10%, 500V
C313	24082260	PF, 4700pF, 100V
C314	24591563	PF, 0.056μF
C315	24797229	EL, 2.2μF, ±20%, 50V
C317	24214471	CD, 470pF, ±10%, 500V
C403	24591203	PF, 0.02μF
C404	24797229	EL, 2.2μF, ±20%, 50V
C417	24214391	CD, 390pF, ±10%, 500V
C421	24794470	EL, 47μF, ±20%, 16V
C431	24794101	EL, 100μF, ±20%, 16V
⚠C440	24082553	PF, 9100pF, ±3%, 1250V
⚠C442	24082697	PF, 0.43μF, 250V
C445	24828223	PF, 0.022μF, 200V
C446	24700100	EL, 10μF, ±20%, 250V
C448	24640908	EL, 33μF, ±20%, 160V
C449	24794102	EL, 1000μF, ±20%, 16V
C463	24212152	CD, 1500pF, ±10%
C471	24797479	EL, 4.7μF, ±20%, 50V
C474	24794100	EL, 10μF, ±20%, 16V
C504	24353090	CD, 9pF, ±0.25pF
C510	24797229	EL, 2.2μF, ±20%, 50V
C514	24591223	PF, 0.022μF
C515	24538104	PF, 0.1μF
C607	24797100	EL, 10μF, ±20%, 50V
C609	24591103	PF, 0.01μF
C610	24795220	EL, 22μF, ±20%, 25V
C611	24539104	PF, 0.1μF
C613	24794221	EL, 220μF, ±20%, 16V
C614	24797478	EL, 0.47μF, ±20%, 50V
C801	24082001	PF, 0.47μF, ±20%, AC125V
C810	24086052	EL, 220μF, ±20%, 200V
C811	24092270	CD, 4700pF, ±20%, AC400V
C812	24094820	CD, 2200pF, ±20%, AC400V
C815	24094820	CD, 2200pF, ±20%, AC400V
C819	24766478	EL, 0.47μF, ±20%, 50V
C840	24795471	EL, 470μF, ±20%, 25V
C842	24792101	EL, 100μF, ±20%, 6.3V
C843	24539104	PF, 0.1μF
C860	24214103	CD, 0.01μF, ±10%, 500V
C862	24591821	PF, 820pF
C863	24539104	PF, 0.1μF
C865	24092345	CD, 1000pF, ±10%, 2kV
C866	24669478	EL, 0.47μF, ±20%, 50V
C867	24212682	CD, 6800pF, ±10%
C868	24667101	EL, 100μF, ±20%, 25V
C869	24678229	EL, 2.2μF, ±20%, 200V
C870	24095802	PF, 0.068μF, 400V
C871	24092345	CD, 1000pF, ±10%, 2kV
C873	24539224	PF, 0.22μF
C874	24435221	CD, 220pF, 500V
C876	24539104	PF, 0.1μF
C884	24640018	EL, 220μF, ±20%, 160V
C885	24214471	CD, 470pF, ±10%, 500V
C889	24795471	EL, 470μF, ±20%, 25V
C891	24082229	PF, 0.1μF, ±10%, 250V
C893	24092338	CD, 270pF, ±10%, 2kV

Location No.	Part No.	Description
C894	24092338	CD, 270pF, ±10%, 2kV
C898	24212101	CD, 100pF, ±10%
C902	24211102	CD, 1000pF, ±10%, 2kV
C921	24212821	CD, 820pF, ±10%
C922	24212102	CD, 1000pF, ±10%
C923	24212821	CD, 820pF, ±10%
C972	24794220	EL, 22μF, ±20%, 16V
CA28	24472100	CD, 10pF
CA29	24472100	CD, 10pF
CA33	24232103	CD, 0.01μF, +80%, −20%
CA36	24474101	CD, 100pF, ±10%
CA37	24474101	CD, 100pF, ±10%
CA38	24474101	CD, 100pF, ±10%
CA42	24794100	EL, 10μF, ±20%, 16V
CA43	24232103	CD, 0.01μF, +80%, −20%
CA68	24794100	EL, 10μF, ±20%, 16V
CA69	24232103	CD, 0.01μF, +80%, −20%
CB01	24794470	EL, 47μF, ±20%, 16V
CB20	24474101	CD, 100pF, ±10%
CR01	24797478	EL, 0.47μF, ±20%, 50V
CR02	24797478	EL, 0.47μF, ±20%, 50V
CR03	24797478	EL, 0.47μF, ±20%, 50V
CS02	24797229	EL, 2.2μF, ±20%, 50V
CS03	24797478	EL, 0.47μF, ±20%, 50V
CS10	24797479	EL, 4.7μF, ±20%, 50V
CS11	24797478	EL, 0.47μF, ±20%, 50V
CT63	24591223	PF, 0.022μF
CV06	24797478	EL, 0.47μF, ±20%, 50V
RESISTORS		
R101	24382153	OMF, 15k ohm, 1W
R102	24381560	OMF, 56 ohm, 1/2W
R103	24366681	CF, 680 ohm
R201	24552391	OMF, 390 ohm, 1/2W
R208	24366683	CF, 68k ohm
R227	24366273	CF, 27k ohm
R230	24366223	CF, 22k ohm
R233	24366152	CF, 1500 ohm
R235	24366184	CF, 180k ohm
R236	24366101	CF, 100 ohm
R237	24366101	CF, 100 ohm
R238	24366562	CF, 5600 ohm
R239	24366152	CF, 1500 ohm
R241	24366433	CF, 43k ohm
R242	24366473	CF, 47k ohm
R244	24366393	CF, 39k ohm
R245	24366184	CF, 180k ohm
R246	24366225	CF, 2.2M ohm
R247	24366561	CF, 560 ohm
R301	24366102	CF, 1k ohm
R303	24366102	CF, 1k ohm
R304	24366393	CF, 39k ohm
R305	24322109	MF, 1 ohm, 1W
R306	24366393	CF, 39k ohm
R307	24366624	CF, 620k ohm
R313	24366913	CF, 91k ohm
R317	24366363	CF, 36k ohm
R327	24338829	MF, 8.2 ohm, 1W
R336	24383271	OMF, 270 ohm, 2W
R337	24366223	CF, 22k ohm
R338	24366223	CF, 22k ohm
R401	24366391	CF, 390 ohm
R402	24366103	CF, 10k ohm
R403	24366332	CF, 3300 ohm

Location No.	Part No.	Description
R404	24553121	OMF, 120 ohm, 1W
R405	24553392	OMF, 3900 ohm, 1W
R406	24366333	CF, 33k ohm
R407	24366223	CF, 22k ohm
R410	24366391	CF, 390 ohm
R411	24366561	CF, 560 ohm
R412	24366560	CF, 56 ohm
R416	24510152	Cement, 1500 ohm, 5W
R421	24321339	OMF, 3.3 ohm, 1/2W
R422	24366471	CF, 470 ohm
R430	24366102	CF, 1k ohm
R431	24366103	CF, 10k ohm
R432	24366222	CF, 2200 ohm
R448	24338828	MF, 0.82 ohm, 1W
R472	24376270	CF, 27 ohm, 1/2W
⚠R475	24366100	CF, 10 ohm
R476	24366823	CF, 82k ohm
R477	24366223	CF, 22k ohm
⚠R478	24327133	MF, 13k ohm, ±1%, 1/4W
R481	24366333	CF, 33k ohm
⚠R482	24327562	MF, 5600 ohm, ±1%, 1/4W
R503	24366334	CF, 330k ohm
R504	24366332	CF, 3300 ohm
R506	24366101	CF, 100 ohm
R507	24366101	CF, 100 ohm
R508	24366101	CF, 100 ohm
R513	24366332	CF, 3300 ohm
R514	24366332	CF, 3300 ohm
R603	24366391	CF, 390 ohm
R604	24366102	CF, 1k ohm
R605	24366339	CF, 3.3 ohm
R663	24366221	CF, 220 ohm
R808	24000269	PTC Thermisotr, 7 ohm, ±20%, AC140V
R810	24510129	Cement, 1.2 ohm, 5W
R816	24366471	CF, 470 ohm
R818	24366561	CF, 560 ohm
R819	24366102	CF, 1k ohm
R861	24382103	OMF, 10k ohm, 1W
R862	24381220	OMF, 22 ohm, 1/2W
R864	24552102	OMF, 1k ohm, 1/2W
R866	24552470	OMF, 47 ohm, 1/2W
R870	24381271	OMF, 270 ohm, 1/2W
R871	24381820	OMF, 82 ohm, 1/2W
R872	24382104	OMF, 100k ohm, 1W
R883	24381153	OMF, 15k ohm, 1/2W
R884	24366102	CF, 1k ohm
R889	24546109	FR, 1 ohm, 1/2W
R891	24366102	CF, 1k ohm
R898	24946395	CC, 3.9M ohm, ±10%, 1/2W
R899	24946395	CC, 3.9M ohm, ±10%, 1/2W
R901	24376472	CF, 4700 ohm, 1/2W
R902	24376472	CF, 4700 ohm, 1/2W
R903	24376472	CF, 4700 ohm, 1/2W
R911	24366101	CF, 100 ohm
R912	24366101	CF, 100 ohm
R913	24366101	CF, 100 ohm
R920	24000568	FR, 4.7 ohm, 1W
R921	24366331	CF, 330 ohm
R922	24366331	CF, 330 ohm
R923	24366331	CF, 330 ohm
R931	24366122	CF, 1200 ohm
R932	24366122	CF, 1200 ohm
R933	24366122	CF, 1200 ohm

Location No.	Part No.	Description
R941	24366220	CF, 22 ohm
R942	24366220	CF, 22 ohm
R943	24366220	CF, 22 ohm
R961	24554183	OMF, 18k ohm, 2W
R962	24554183	OMF, 18k ohm, 2W
R963	24554183	OMF, 18k ohm, 2W
R971	24366821	CF, 820 ohm
R972	24366102	CF, 1k ohm
R973	24366391	CF, 390 ohm
R974	24366331	CF, 330 ohm
RA03	24366102	CF, 1k ohm
RA07	24366102	CF, 1k ohm
RA08	24366102	CF, 1k ohm
RA13	24366102	CF, 1k ohm
RA16	24366102	CF, 1k ohm
RA17	24366102	CF, 1k ohm
RA18	24366102	CF, 1k ohm
RA22	24366472	CF, 4700 ohm
RA23	24366472	CF, 4700 ohm
RA24	24366472	CF, 4700 ohm
RA25	24366822	CF, 8200 ohm
RA26	24366102	CF, 1k ohm
RA27	24366102	CF, 1k ohm
RA33	24366103	CF, 10k ohm
RA34	24366102	CF, 1k ohm
RA35	24366102	CF, 1k ohm
RA36	24366103	CF, 10k ohm
RA37	24366331	CF, 330 ohm
RA38	24366331	CF, 330 ohm
RA61	24366103	CF, 10k ohm
RA62	24366103	CF, 10k ohm
RA67	24366103	CF, 10k ohm
RA68	24366103	CF, 10k ohm
RA70	24366333	CF, 33k ohm
RA71	24366683	CF, 68k ohm
RA72	24366223	CF, 22k ohm
RA73	24366103	CF, 10k ohm
RB01	24366271	CF, 270 ohm
RB03	24366101	CF, 100 ohm
RB09	24366470	CF, 47 ohm
RB11	24366103	CF, 10k ohm
RB26	24366103	CF, 10k ohm
RB27	24366103	CF, 10k ohm
RB28	24366104	CF, 100k ohm
RB30	24366103	CF, 10k ohm
RB40	24366103	CF, 10k ohm
RB41	24366182	CF, 1800 ohm
RB42	24366102	CF, 1k ohm
RB43	24366103	CF, 10k ohm
RB44	24366682	CF, 6800 ohm
RB45	24366221	CF, 220 ohm
RR90	24366122	CF, 1200 ohm
RR91	24366122	CF, 1200 ohm
RR92	24366122	CF, 1200 ohm
RR93	24366472	CF, 4700 ohm
RS01	24366102	CF, 1k ohm
RT61	24366332	CF, 3300 ohm
RT63	24366102	CF, 1k ohm
RV01	24366750	CF, 75 ohm
RV03	24366390	CF, 39 ohm

COILS & TRANSFORMERS

Location No.	Part No.	Description
L203	23238510	Coil, Peaking, TRF4181AJ
L301	23103880	Coil (Ferrite Bead), TEM2011Y
L410	23103880	Coil (Ferrite Bead), TEM2011Y
⚠L462	23231119	Deflection Yoke, TDY-320QS
L805	23248150	Coil, Choke, TLN3427
L806	23221747	Coil, Choke, TRF9253D
L862	23103880	Coil (Ferrite Bead), TEM2011Y
L883	23103880	Coil (Ferrite Bead), TEM2011Y
L884	23103880	Coil (Ferrite Bead), TEM2011Y
L885	23221722	Coil, Choke, TLN3142D
L886	23103880	Coil (Ferrite Bead), TEM2011Y
⚠L901	23200919	Coil, Degaussing, TSB2100
LA01	23289100	Coil, Peaking, TRF4100AF
LB01	23289560	Coil, Peaking, TRF4560
T401	23224983	Transformer, Horiz. Drive, TLN1039
⚠T461	23236482	Transformer, Flyback, TFB4125DD
⚠T801	23211668	Line Filter, TRF3199
⚠T840	23213513	Transformer, Power, TPW1459AZ
⚠T862	23217304	Transformer, Converter, TPW3318AD

SEMICONDUCTORS

Location No.	Part No.	Description
Q101	23114528	Transistor, 2SC1740S-Q
Q301	B0377890	IC, TA8403K
Q402	A6330069	Transistor, 2SC2482 FA-1
⚠Q404	23314375	Transistor, ON4409(508D)
Q421	23314141	Transistor, 2SC3852
Q471	23114530	Transistor, 2SA933S-Q
Q472	23114528	Transistor, 2SC1740S-Q
Q501	B0385424	IC, TA1223AN
Q610	23119668	IC, TDA2611A
Q801	23905433	IC, STR-Z2753
Q817	23114528	Transistor, 2SC1740S-Q
Q818	A6012010	Transistor, RN2201
Q819	23114528	Transistor, 2SC1740S-Q
Q840	23318299	IC, L78MR05
Q843	A6002050	Transistor, RN1205
⚠Q862	A8643135	Photo Coupler, TLP621(GRL)
Q883	A6907777	IC, S1854 FA-4
Q901	A6330059	Transistor, 2SC2482(C)
Q902	A6330059	Transistor, 2SC2482(C)
Q903	A6330059	Transistor, 2SC2482(C)
Q971	A6534053	Transistor, 2SA1015-Y(TE
QA01	23905436	IC, TMP87CH34BN
QA02	23904938	IC, 24LC01BI/P
QB01	23114528	Transistor, 2SC1740S-Q
QB03	A6002050	Transistor, RN1205
QB21	23114528	Transistor, 2SC1740S-Q
QB30	23114528	Transistor, 2SC1740S-Q
QB40	23114528	Transistor, 2SC1740S-Q
D102	23316673	Diode, Zener, MTZJ5,6C
D201	23316292	Diode, Zener, UZ3.3BSA
D204	23115537	Diode, 1SS131
D205	23115537	Diode, 1SS131
D210	23115537	Diode, 1SS131
D301	A7568460	Diode, TVR-1B
D302	23118094	Diode, EU2A
D406	23118094	Diode, EU2A
D408	23118479	Diode, BYD33J
D410	23316325	Diode, Zener, UZ9.1BSC
D421	23316690	Diode, Zener, MTZJ10B
D441	23316324	Diode, Zener, UZ9.1BSB
D445	23118479	Diode, BYD33J

Location No.	Part No.	Description
D471	A7568460	Diode, TVR-1B
⚠D472	23115774	Diode, Zener, RD6.2E(4)
D501	23316323	Diode, Zener, UZ9.1BSA
D502	23316323	Diode, Zener, UZ9.1BSA
D503	23316323	Diode, Zener, UZ9.1BSA
D801	A7568754	Diode, 1S1887AFA-1
D802	A7568754	Diode, 1S1887AFA-1
D803	A7568754	Diode, 1S1887AFA-1
D804	A7568754	Diode, 1S1887AFA-1
D840	23316962	Diode, S1WBA20 4101
D845	23115537	Diode, 1SS131
D862	23118094	Diode, EU2A
D864	23118094	Diode, EU2A
D866	23316360	Diode, Zener, UZ27BSC
D875	23316333	Diode, Zener, UZ12BSB
D876	23316360	Diode, Zener, UZ27BSC
D881	23115537	Diode, 1SS131
D883	23316813	Diode, EG1
D884	23316813	Diode, EG1
D885	23118094	Diode, EU2A
⚠D899	24000268	Varistor, ENC271D-14A
D902	23115537	Diode, 1SS131
D903	23115537	Diode, 1SS131
DB01	23358501	Diode (LED), SCL003URC5F
DB03	23358522	LED, SIR-56SB3F
DB30	23115537	Diode, 1SS131

MISCELLANEOUS

Location No.	Part No.	Description
E502	23848729	Rubber Wedge
⚠F301	23144727	Fuse, 0.4A
F301A	23165433	Holder, Fuse
⚠F470	23144495	Fuse, 0.8A
F470A	23165433	Holder, Fuse
⚠F801	23144888	Fuse, 5.0A, 125V
F801A	23165433	Holder, Fuse
⚠F860	23144509	Fuse, 2.5A
G060	24366101	CF, 100 ohm
G101	23316694	Diode, Zener, UZT33
G204	23238714	Coil, Peaking, TRF4100AJ
G411	23103880	Coil (Ferrite Bead), TEM2011Y
G813	24092270	CD, 4700pF, ±20%, AC125V
G814	24094820	CD, 2200pF, ±20%, AC250V
G816	24094820	CD, 2200pF, ±20%, AC250V
G861	23103880	Coil (Ferrite Bead), TEM2011Y
⚠G882	23316653	Diode, Zener, MTZJ2.7B
KB01	23905177	Remote Sensor, PIC-TB16
P661	23365728	Jack, Eerphone
⚠P801	23176004	Power Cord
SA01	23145227	Switch, Push, 1C1P
SA02	23145227	Switch, Push, 1C1P
SA03	23145227	Switch, Push, 1C1P
SA04	23145227	Switch, Push, 1C1P
SA05	23145227	Switch, Push, 1C1P
SA07	23145227	Switch, Push, 1C1P
⚠SR81	23146916	Power Relay, DG1U-12
⚠V901A	23902021	Socket, CRT, 8P
V901M	23102409	Magnet, P/C, MAG-1070
W661	23351111	Speaker, SPK-1378, 77x77mm, 16 ohm
X401	23153721	Ceramic Resonator, 503kHz, TCR1023
X501	23153961	Crystal, 3.58MHz
XA01	23153325	Ceramic Resonator, 8.00M, TCR1056

PC BOARD ASSEMBLIES

Location No.	Part No.	Description
*M051Z		Main Board, PB6221-1
*M052Z		CRT Drive Board, PB6221-2

PICTURE TUBE

Location No.	Part No.	Description
⚠V901	23312676	Picture Tube, A48KZL70X(LW)

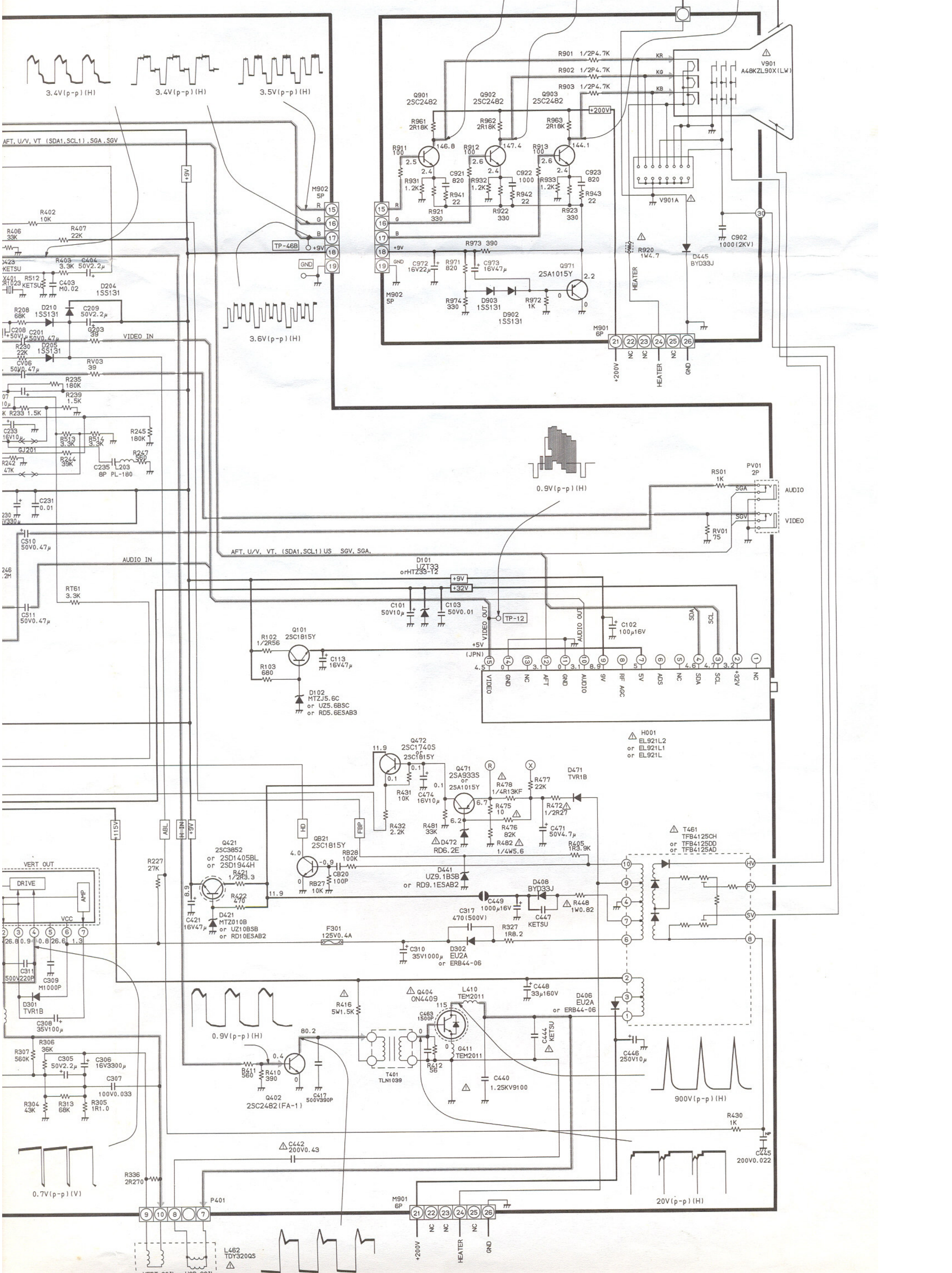
TUNER

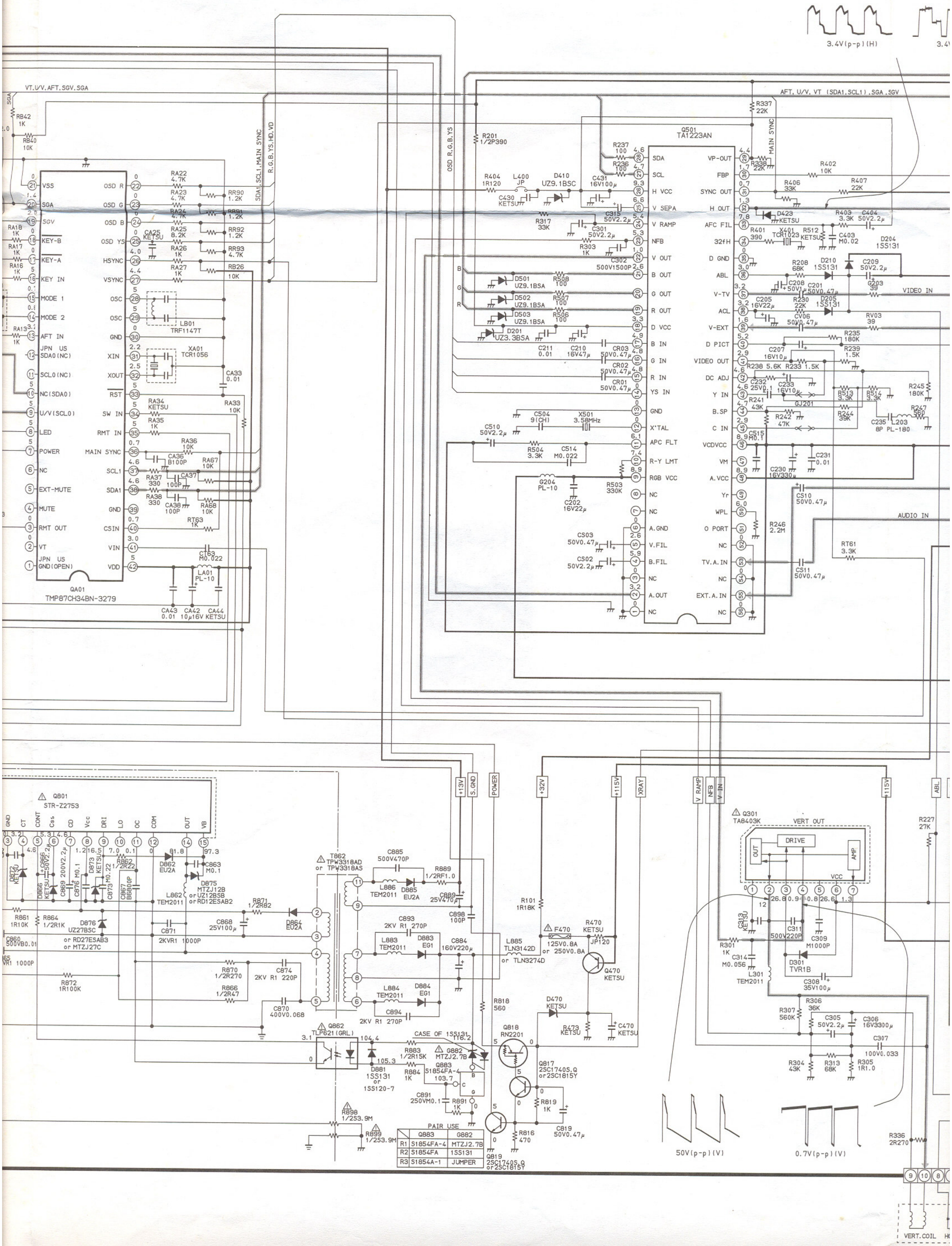
Location No.	Part No.	Description
⚠H001	23321224	Tuner, EL921L2

ACCESSORIES

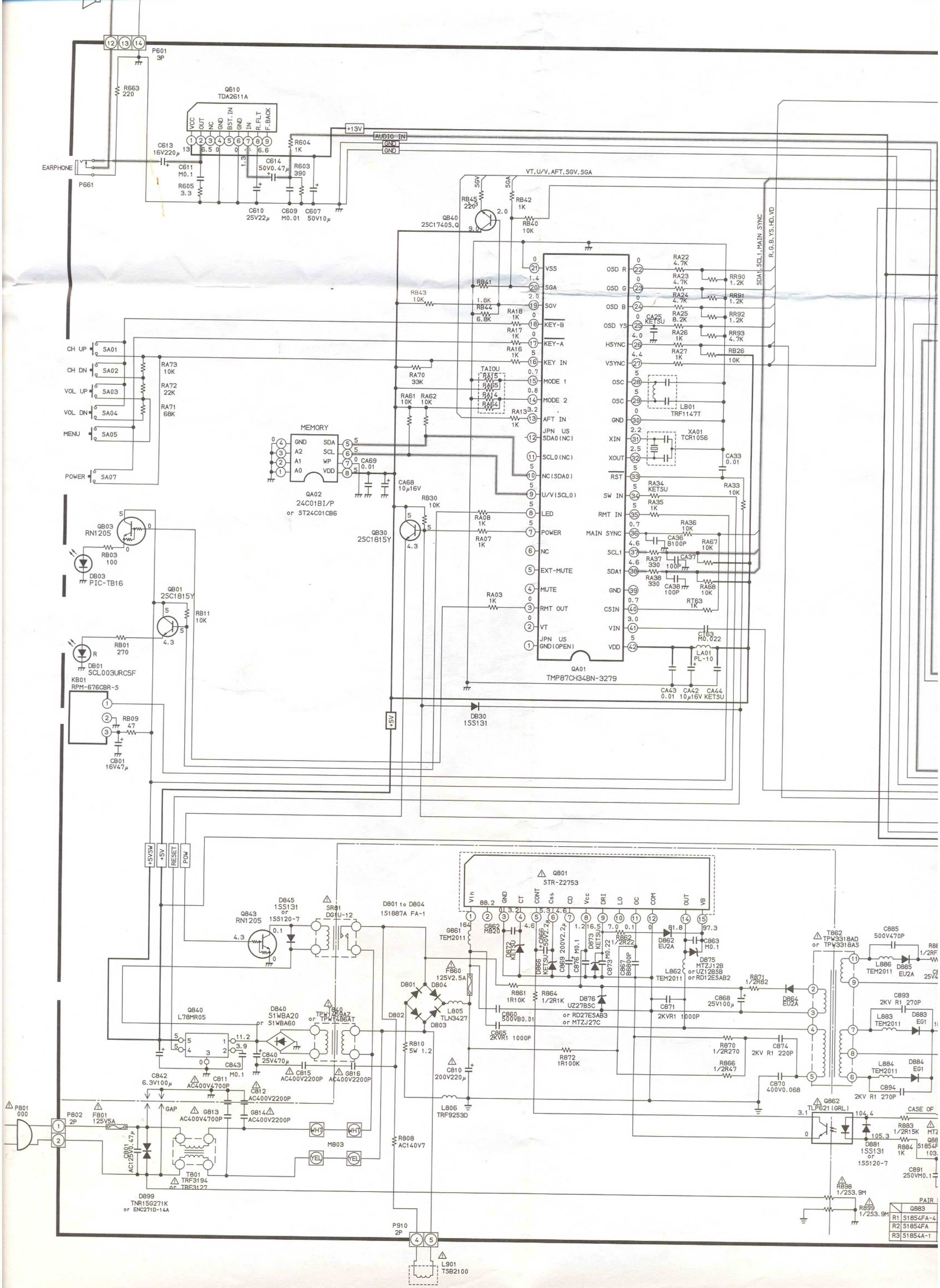
Location No.	Part No.	Description
K912	23306161	Remote Hand Unit, CT-9852
AT03	23305976	Battery Cover
Y101	23562704	Owner's Manual, English, CF19F22
Y101	23562763	Owner's Manual, English/Spanish, CL20F22
Y101F	23562705	Owner's Manual, French, CF19F22
Y107	23142003	Adapter, Antenna, AD-503J (CL20F22)
Y126	23124866	Antenna, VHF Telescopic (CL20F22)

051Z MAIN PART PB6221-1   CRT DRIVE PART PB6221-2





	Q883	G882
R1	S1854FA-4	MTZJ2.7B
R2	S1854FA	1SS131
R3	S1854A-1	JUMPER


P601
3P
Q610
TDA2611A
EARPHONE
P661
+13V
AUDIO IN
GND
VT,U/V,AFT,SGV,SGA
QB40
2SC1740S,Q
QA01
TMP87CH34BN-3279
MEMORY
QA02
24C01BI/P
or ST24C01CB6
QB30
2SC1815Y
QB03
RN1205
DB03
PIC-TB16
QB01
2SC1815Y
DB01
SCL003URC5F
KB01
RPM-676CBR-S
DB30
1SS131
CH UP
CH DN
VOL UP
VOL DN
MENU
POWER
LB01
TRF1147T
XA01
TCR1056
Q801
STR-Z2753
Q843
RN1205
D845
1SS131
or
1SS120-7
SR81
DG1U-12
D801 to D804
1S1887A FA-1
Q840
L78MR05
D840
S1WBA20
or S1WBA60
T840
TPW1259AZ
or TPW1286AT
T862
TPW3318AD
or TPW3318AS
Q862
TLP621(GRL)
T801
TRF3194
or TRF3127
D899
TNR15G271K
or ENC271D-14A
P801
000
P802
2P
F801
125V5A
F860
125V2.5A
P910
2P
L901
TSB2100
CASE OF
PAIR
Q883
R1 S1854FA-4
R2 S1854FA
R3 S1854A-1